

Green

[1925 Nov. 14?]

On attraction or affinity.

On Gravitation

Monday 14th

On Pneumatics of the contractility and expansibility of the Air
Hydrostatics of the gravitation of water and weights in water

Tuesday 15th

~~There way of increasing attraction~~ There are two kinds of attraction Cohesive and Chemical - and three way of overcoming this attraction; Heat, Solution, and Roasting

Thursday 17th

Chemical attraction or affinity - of Synthesis and Analysis, attended by the change of form - Change of temperature and change of colour attend chemical combinations, not always necessary
1st Some bodies unite in all proportions 2nd others to a certain extent 3rd others in one proportion only 4th others in different proportions - Of Elective affinity

Friday 18th

Of Heat - & the repulsive principle - Caused by combustion or fire, 2nd percussion or collision perhaps, Caused by Condensation - 3rd by Friction by wood & 4th by Electricity ^(Galvanism) 5th Chemical Union. 6th Sun

Monday 21st

Caloric, diminishes the power of cohesion as in the gases, for instant the air. also chemical attraction - Solids caused by attraction, Gases by repulsive attraction - fluids by mutual attraction &c - Caloric exist free, Cold, only the abstraction of caloric - produced by Mur Ammonia & nitrate of potash.

Tuesday 22nd

Radiation reflection of Heat & light, On Thermometers - Caloric is carried off by contiguous bodies called conductors. Silver the best Metallic conductor Lead the worst - Caloric expand except cast iron and water expand & cold & heat

Thursday 24th

Radiation of Cold - The colour of substance does not effect the radiation of Cold which is not the case with Caloric and black the best - Latent Caloric, when bodies lose their humidity density absorb caloric which goes from its free to its latent state and vice versa &c

Friday 25th

Caloric passing from a rare to a dense medium gives out Caloric

Animal Electricity, the Cat contains a considerable quantity of Electricity which may be drawn from the nose ~~or~~ ^{ears} or paws ~~and~~ by rubbing the back ~~at~~ at a cold frosty time - large quantities contained in the torpedos and frog, Monday Dec 3th

Galvanism
In all cases where the Animation is suspended and irritability is not destroyed, may be restored to life by Galvanism, as hanging - arousing or death by noxious vapours - Galvanism is also useful in Palsy, deafness ~~and~~ Rheumatism and diseases of the eye -
Galvanism - Voltaism - formed of Copper, Zinc and Cloth in contact cloth to be wet as a conductor from the pile - but in the trough there is no cloth - several substances of almost any kind give the effect of Galvanism, as drinking beer from a metallic vessel - or eating with a silver spoon &c Animal Galvanism Magnetism, and divine rods
Tuesday Dec 4th

Magnetism Animal &c - " - " - Oration on the ~~size~~ progress of Chemical discoveries &c
Thursday Dec 6th

Of Ponderable substances of ~~Ponderable~~ ^{base} and Imponderable Matter - Of Imponderable; Gases combinations of ponderable substances - the first Oxygen, Nitrogen, and Hydrogen are Homogeneous, gases are the same in all temperature, consist of an imponderable body with caloric, ~~the light in some~~ &c
Oxygen produced from Metallic Oxide as lead or Magnesia, red oxide of Mercury - May also be obtained from the Neutral salts by decomposing the Acid, but Nit Salts and the Potash become nitrite of Potash - also from Oxy muriate of Potash, also from green leaves in water and exposed to light, mint the best when fresh - Oxygen the only gas that produces light -
Friday Dec 9th

The manner of Testing oxygen Gas - Eudiometer to try the kind of air
Nitrogen chief part of the air, 79 parts - Animal fibre composed chiefly of Nitrogen - but is composed of four gases
Monday Dec 12th

Nitrogen produce 6 compounds. Air Oxy 24. Nitrog 79 - Nit^a Acid - Nit 1 part 2 1/2 Oxy - Nitrus 1 - 2 Oxy - pure Acid 1 N - Oxy 1/2 - Nit Acid 1
Tuesday -

Nitric Acid produced by Nitrate of Potash or by the Electric fluid passed through the atmospheric air - Nitric acid and water produce heat - added ice or snow produce Cold - If thrown on Oil it inflames when sulphuric acid is added - Test nitrate of Silver with sulph acid - Acid change blue particles to red - They are solid, liquid, gas - Unite with water, earth, alkali &c

Thursday Dec 15th

Nitrous Oxide procured from Nitrate of Ammonia the same effects from Sulphate

Hydrogen Gas consist of ponderable base call Hydrogen and Caloric & Electricity
Hydrogen positive the Oxygen negative which caused their attraction - procured
from Iron filings with dilute Sulp. Acid - Also passing steam through
a red hot glass barrel - It is not absorbed by water - Known by its levity
about 13 times lighter than common air - Fatal to animal life - Vegeta-
bles not injured by it - it is very inflammable this is the cause why Oil, tallow
&c burn - it burns in contact with air only - (On light rays &c?)

Friday Dec 16

It is incapable of supporting flame without common air -

It combines with many substances in Mines &c also in stagnant water, decom-
positions of animal substances - These often rise to the upper regions, and there
perhaps take fire and cause the play phenomena of nature so often seen
with Phosphorus - (Such a lantern falling of a star &c)

Oxygen And Hydrogen coming in contact give off out intense heat And
Dr. Hare has constructed a blow pipe on this principle - by which he melts
and burns the hardest metals ~~and~~ by having the Gases in different vessels
And then two coming in contact give out great heat and form water -
Of water, elastic - bottles well corked sunk some distance in the Sea always
is brought up full of water and the cork not disturbed - the water must
have passed between the particles of the Glass or what
Snow formed of cristallized in different figures - Hail &c

Monday

Heat, light Electricity & Magnetism unponderable Elements -

Oxygen Nitrogen & Hydrogen ponderable - Oxygen combines with
all the imponderable - Nitrogen with only two -

Oxygen And Nitrogen combine in six different proportion -

Hydrogen the lightest of all the gases -

Water spring water absorbs a great quantity of atmospheric air which
gives it its peculiar taste - Water absorbs sometimes about 10 times
its ^{own} bulk of any of the Gases - Water having absorbed oxygen And
the Oxide of Silver is dropped in it - all the oxygen leaves it and the
water is left cold - River water contains many impurities and
ought not to be employed in Chemical purposes - Water in vapour is not
chemically mixed but passes through the air the quantity known by the
Hydrometers - Dew rain and snow contain more oxygen, rock split
by cause of the freezing and water expands by freezing

Green Dec 21st

If Hydrogen ^{3 parts} with Nitrogen form Ammonia or Aqua Ammonia, may be obtained Ammonia by applying heat to aqua Ammonia; may be produced by chemical decomposition and synthesis from quick lime and Mur Ammonia by applying gentle heat — to be collected over ^{mercury} as it is absorbed by water, lighter of all substances ^{gases} but Hydrogen specific gravity to Hydrogen as 8 to 1 — And extinguishes a candle and before it is extinguished there is a yellowish flame caused by the Hydrogen coming in contact with the oxygen — fatal to Animal life — at 56 below 0 the Gas become liquid — it is rapidly absorbed by water — Water do not absorb ~~oxygen~~ Nitrogen or Hydrogen but when combined it absorbs 6 to 70 times its bulk tinges vegetable ~~plants~~ ^{flowers} to brown — blue to Green — Ammonia a Volatile Alkali

Alkalies are substances directly opposite to acids And have an acrid taste And an affinity for water And neutralize acids — decompose animal substances.

Ammonia produced ^{from} animal substance or from the bones, more generally, after the Ammonia is distilled you have left Harts horn — Wolf apparatus for forming aqua Ammonia the strength depends on the temperature the warmer the stronger it will be — and also on the pressure — a tube filled with lean urine decomposes Ammonia — or by the Electrical spark and decomposed into Hydrogen and Nitrogen And become twice as large — Ammonia composed of 3 Measures of Hydrogen and One of Nitrogen — ~~these~~ ^{nascent} these gases however cannot be combined unless they be in their ~~nascent~~ ^{nascent} state, that state just before they ^{are} ~~go~~ into combination —

Ammonia combines with (15 parts) Nitric acid and form Nitrated Ammonia a Neutral salt — And when thrown upon live coals it inflames — it is of a brown colour — An Amalgam when any two Metals unite — ^{xx} heat air.

Oxygen whose properties — 0 8 ** — negative 0 not absorb & support Comb

Nitrogen appends to oxygen + 8c

Hydrogen 8c —

Carbon, no heat present, and is the first solid substance or Charcoal it is pure in the Diamond possesses much of the properties of Carbon, derives its superiority from its hardness and lustre and only to be polished by Diamond powder — Diamonds of different colour — cut in the rose, and Brillant form Diamond is combustible, may be burned or melted by a large furnace — Diamond is pure charcoal purified of its hydrogen and earthy substances

There are 96 parts of Carbon in Lehigh Coal - also some in Bitumen
Lamp Black a more pure ^{Charcoal} Carbon and is the residue after making Tur-
pentine which has been set on fire

Charcoal, brittle, a good ^{conductor} of Electricity, bad of heat, resist the power
of putrefaction of both Animal and Vegetable substances, incapable
of infusion, when newly made ~~it~~ absorbs large quantities of
gases —

Carbon enters large in all the substances of nature, Vegetable & Animal
and unites with Oxygen 2 parts Carbon 1 part form Carb: Acid (Carbon^{carb} Oxy^{Oxy})
Carbonic Acid formed from Ammonia or Carbonate of lime or Marble
and Sulph: Acid and the gas will escape while form the acid, the gas
is heavier than the Atmospheric Air, it is absorbed by water - under very
great pressure may produce ~~liquid~~ a fluid - Combines with water - Acid
Change Vegetable Blues to red —

(of Volume the same quantity by measure)

Carbonic Acid, promotes vegetation if applied to the roots — the first
gas ever discovered, exist in nature uncombined — Some caverns con-
tain — the Lake of Averno or as some say the mouth of the infernal
regions — Carbonic combines with Air in 1 to 1000 — is liberated from
the water of some Springs as Saratoga — it formed by respiration and
Combustion — also from distilleries — the test is lime or breathing
in lime water produces a milky fluid — Plants of all kinds give
it out in the shade or night but Oxygen in the day or light &c
the Carbonic Acid is sent through the air to destroy its deleterious
and effect — Liberated from the burning of coal, also in wells, to know
this a candle to be lit down and if extinguished there is danger —
to cleanse the well of Carbonic acid — Drop a hose in the and build
a large fire at the end of it — Danger in sleeping near a burning
lime kiln — the Effects of this gas is actually deleterious to the lungs
unless very much diluted — if very pure cannot be inhaled. — as Anti-
Septic⁹⁰⁰ — the Common Mineral is not more than containing large
quantities of this gas — about 6 times its ~~own~~ bulk —

Carbonic Oxide, produced by any substance that takes of the Oxygen
from the Carbonic Acid as iron filings, this substance of no great
use — " —

Carbonate of Ammonia, ^{or Sub Carbonate} Ammonia 1 Carbonic Acid 2 parts
they unite in gas, and form a solid substance, and therefore is sub-
limed - Volatile Salts smell like nearly to Ammonia -

By Carbonate of Ammonia - Ammonia 2 part Carb Acid 2 parts
is absorbed by air - dissolves in twice its weight of water, changes
vegetables, greens blues, ^{to green}, Nitrate of ammonia obtained
from Carb of Ammonia - Tuesday Dec 27th

Carbon with Nitrogen, forming Cyanogen or Carburetted Nitrogen
Cyanogen, Nitrogen 1 Carbon gas 2 parts - Negative electrified - ~~forms~~
or Prussiate ^{or Cyanide} of Mercury - absorbable by water - extinguishes flame, burns
with a bluish colour - Combines with different bases form Cyanides
and unites with Hydrogen $\alpha\alpha$ 2 parts form Prussic acid or
~~Cyano-Hydrogen acid~~ Hydro-Cyanic acid, formed from peach
kernels - from the destruction of animal substances as dry blood -
This acid freezes itself when a rod is introduced in it upon the rod -
is a violent poison, when you wish to kill an animal suddenly is
to be done with this acid - with Iron form Prussian blue -
Is used in Medicine, to be excluded from the atmosphere or light as it
is decomposed by it - Salts formed from these are the Hydro-Cyanates
but of no utility -

Carbon and Hydrogen, form, By Carburetted Hydrogen gas $\alpha\alpha$ 2 parts
or as it is called Olefiant - burns with the ^{splendour} greatest, with about 3 parts
of Oxygen - flame owing to the Carbon - give a great light -
these also form - Carburetted Hydrogen, Carbon 1 Hydrogen 2 parts
used for gas lights - from charcoal it is obtained, lighter than air
fatal to animal life - supports flame - Thursday Dec 29

Boron in the atmosphere is generally unattained - is analogous

With Oxygen it forms Boracic acid, by burning Boron and is by Luthetis, like acids, changes blue, to red - colours Alcohol to greenish blue - Boracic acid found in some lakes near volcanoes, called *Bomburze sedatives salts*
With Hydrogen forms Boruretted Hydrogen -

Silicon the base of rock-crystals, but little known of it
With Oxygen forms Silex the most common substance in nature except perhaps lime, as rocks are chiefly composed of them, there is also a portion in Mortar &c in quartz -

Phosphorus, may be obtained by artificial means, of a yellowish colour, soft like wax - made of burn bones with lime by Sulp Acid smokes in moist air, highly inflammable, is dissolved by Alk &c and give out light - always to be kept under water in consequence of its inflammability

With Oxygen forms Phosphoric Acid by burning the Phosphorus in Oxygen or in the air - ~~and~~ by the secretion of phosphorus the Fire Fly and glow worm give out their light, also is given off from animal & from water as frogs &c -

Acid contains 1 phos 2 Oxy, ^{with basis} form the Phosphates as Am
Phosphorous acid, 1 phos - 1 Oxy, ^{with} basis is form Phosphites,
Hypo Phosphorous acid - 1 phos - $\frac{1}{2}$ Oxy - no use -

Oxide of Phosphorus, not certain in what proportions

With Hydrogen form Phosphuretted Hydrogen gas takes fire as soon as it come to the atmosphere - form Potash and water by being decomposed by heat - consists of equal parts of Phosp. & Hydrogen &c
By Phosphuretted Hydrogen - may be procured from tin & Zinc by adding Sulp Acid - Phosphuretted of Ammonia & Carbon

Monday Aug 2nd 1826

Sulphur coal, wax &c

With Oxygen forms Sulp Acid if coloured it is impure
formed by burning Nitre and ~~etc~~ — Sulp 1 - Oxy 3 -

Hypo Sulphuric Acid Oxy 2½ Sulp 1

Sulphurous Acid - Oxy 2 Sulp 1

Hypo Sulphurous Acid - Oxy 1½ Sulp 1

Sulphuric Acid combines with various basis forms the Sulphates, and has a stronger affinity for them than any other Acid

Sulphate of Ammonia - found at Atma and Besuvians, or adding Sulp Acid to Carbonate of Ammonia and the Carbonic acid is driven off — the Sulp of Ammonia forms the Sulp of Soda with Muriate of Soda —

Sulphate of Ammon - Sulp Acid 1 Carb Ammon 1

Hypo. Sulp. Acid, - formed by passing Sulphurous Acid in water holding in solution the per Oxy of Manganese, barite is then thrown, then the Sulphuric acid is thrown in and extracts it from barite — with basis form Hypo Sulphates.

Sulphurous Acid. formed by ~~the~~ Tin or Mercury and Sulp Acid and heat applied and the tin or Mercury takes up a portion of Oxy: Or burn Sulphur in Oxygen gas — Any substance that will extract the Oxy: will do — and is changed by it to white &c

Of great use in Bleaching - ~~changes~~ red exposed to the fumes of the Sulp acid changes it white or flesh colour - fatal to animal life — forms the Sulphites - ~~but~~ but when exposed to the At-
mosphere ~~are~~ are changed to the Sulphates &c, it is heavier than ^{the atmosphere}

Sulphuretted Hydrogen — by pouring ~~pouring~~ dilute Sulphuric acid, on Sulphuret of Potash — Combines with metallic substances, blackening them, ^{covered by acetate of Lead} ~~color black any substances~~
By Sulphuretted Hydrogen perhaps does not exist

Sulphuret of Carbon; sometimes called Oil of Alcohol — of no use.

Sulphuret of Phosphorus, by ^{or rubbing} melting Sulp and Phosphorus together it is exceedingly explosive when rubbed together —

Sulphur combines with Carbon ^{Tuesday} &c as above —

_____ combines with Potassium, Specific gravity about 8 times heavier than water — like water — a good conductor — inflammable &c — Potassium procured by passing potash through a red-hot gun barrel has a strong affinity for oxygen — forms the Oxide potassium and per Oxide of Potassium — from Ammonia it is made, therefore is called the vegetable alkali — and with Oxygen forms Potash

Of Potash — ashes with water or by boiling down to potash from which Pearl Ash is procured &c —

Potash changes vegetable Blues, green — Yellow, Brown

Potashuretted Hydrogen gas — — — Potash

With Nitric acid, ~~and~~ form common Nitre or Salt petre of the shops or Nitrate of Potash, it is formed by nature in India and our own Country — Nitre and sulphur being thrown on fire produce curious result —

Gun powder produced from Sulphur, Nitre 96 parts and Char, ^{cool} 5 put in a barrels that glaze it &c —

3 parts Nitre 2 least Potash and 1 Sulp — heated in water and melt and explode —

Thursday Jan 3

Potash - with the ^{rockets made of nitre, sulphur &c -} acids forms salts analogous to Ammonia
Nitre - with

Hydrocyanate of Potash - with Potash and Cyanogen - ~~it~~ is
the very best test for Iron

By - Carbonate of Potash, ~~is~~ Pearl ash purified or Carb. Potash
(Combines with the Oils &c found in the shops) is
exposed to Carbonic Acid gas - Certain relief for tooth ache

Boracic acid of course

Sulphate of Potash - obtained after the Nitrate is formed, is
called vitriolated Tartar - Ammonia sometimes combines with it.

Hydro-sulphate of Potash, - Hydrogen and Sulphate of Potash

Sulphuret of Potash, heating sulph and Potash equal parts.

Potash - with Silica form glass - equal parts - - - And
is used in the arts for making glass, soap, also in dyeing &c

Sodium; obtained by strong electric action on Soda or Potassium
also obtained from Potassium 2 and Soda 1 part - will be
soft malleable similar to Potassium - no inflammation with
water - ~~diff~~ may be spread out like leaves and may be held
~~with~~ so may Iron and Platina -

Soda - of Sodium 2 parts Oxyg 1 - obtained from the
ashes of Vegetables of the sea shore only - similar to Potash
with muriatic acid it forms common table salt -

Potas Soda with Silix form Glas Ground or the being
~~the~~ best Glases — Potash only the common Glas.
Soda with Oil form the hard soap, Potash the soft —
The best test to know Soda from Potash is Nitro Muriate of Platina
in Potash there is a precipitate, none in Soda — ~~as alkali~~
Soda ~~as alkali~~ recovers the colour of vegetable tinged by Acids —
Friday Janry.

Soda, from Muriate of Soda, used as potash and does
not corrode metals as Potash

Carbonate of Soda } Sub Carbonate of Soda, forming these from
by Carbonate of Soda } Soda with water, exposed to Carbonic Acid Gas.
possesses some alkaline properties.

Borate of Soda; the common Borax of the shops, and for Gilding
also for the Manufactures of Gems, also in Medicines

Phosphate of Soda, used in Medicine

Sulphate of Soda, Glauber Salts, by Pouring Sulp. Acid on ^{or Mur. Soda} Common Salt

Selenium — found with Sulphur and requisite for its fusion
— odour like horse radish —

Selenic Acid, with Oxygen equal parts &c

Silicium — found with Gold &c

Green

Arsenic; seldom found in nature in common with other
^{or}
Arsenicum substances — pure or Regulus of arsenic has some
thing of the appearance of steel — softer than lead —
No smell when cold — but when warm smells like garlic.
It is easily pulverised &c.

Arsenic Acid — with Oxygen, is both alkali and acid, a white solid
^{white Arsenic}

Arsenous Acid — the common arsenic of the shops 75 parts Ars. 25 Oxyg.
Called white Oxy. Arsenic or Arsenic — Dogs and horses
cannot be killed by it alone also ^{heated until the arsenic is disposed} ~~not~~ ^{it} ~~is~~ ^{not} ~~useless~~ —

Arseneal Solution } 64 grs Arsenous Acid 64 grs Potash Carb, pure Water
Fowler Solution }

Sufficient to make a pound — the Arsenic is
better if solid — Dose 2 to 12 grs twice a
day — " if the dose too large produce Anasarca
Mines and furnaces of Copper destroy the Miasmata of
fevers — applied external to a wound produce death
Sometimes given in solution 4 grs in a pint water
Dose a table Spoonful — Pills, in dose of $\frac{1}{16}$ or $\frac{1}{8}$ gr

Monday Janry 9th 1826

Arsenite of Copper or the Green — of Arsenite of Potash with ^{sulph} ~~solub~~ of Copper.

Arsenate of Copper is of Blue Colour

Arsenuretted Hydrogen Gas. Formed by 4 parts Zinc and 1 part Arsenic with Sulph (acid)
- deleterious to health, burns with a blueish
flame, is not absorbed by water &c lighter than air
and it explodes with the Nitric acid gas —

Red Sulphuret of Arsenic — 67 parts of arsenic and sulphur &c by fusion

Opiments — of Sulphuric acid. Potash &c also arsenic — the
same substance as above — 58 sulphur 42 of arsenic
are in Calico printing to extract the Blue of Indigo &c
it is called the King's yellow in England — there are
not to be washed with soap

Arsenite of Soda, sometimes used in medicine

Arsenic - Combines with earth as Silicon forming glass - if in excess forms rings - if in due proportion gives it great transparency.

Tests - No chemical test sufficient to condemn any one unless you can produce the arsenic itself - take the suspected matter of the stomach examine with a microscope and see if you can find the white arsenic - if dead at the coats of the stomach or duodenum; if not then any the matter ^{with heat not less than 100°} and rub it with about ^{about an inch - 7 inches long and clench at one end} 1/20 of bar charcoal and place this in a glass tube, hold it over the flame of a lamp, and if arsenic shall be present you will see the small crystals - if it does ~~not~~ crystalize see if there be arsenic - scrape off a few crystals and throw them in ^{burning charcoal} heated coals and if arsenic be present you will have a white smoke and very strong smell ^{of garlic} - or place the crystals between two polished ^{pieces of cork or} cents bind them ^{together} with wire and throw them in the fire for some time and there will be white stains on the cents ^{or copper} caused by nothing else than arsenic.

Chemical Test - Take the dry matter boil in pure water then filter and evaporate - then put small portion in a test glass and add ^{a little of} carb of Potash - And ^{then} add Sulphate of Copper and you produce the Steel green - but recollect that A. solut. of Coffee with sulph. Copper will produce also a green colour - Chromate of Potash may also produce this colour - Any colour of a Blue and Yellow produces green -

2nd To Solution of Arsenic in water add the Carb of Potash then add ^{a few drops} Nitrate of Silver and a bright yellow is produced - this ^{colour} may also be performed with the silver with alkalies - they ought not be admitted as decisive but are calculated only as they only excite suspicion.

Dr Cooper Test produces a green colour without Copper
Take the matter and add sol: of Chromate of Potash and in an
hour you have a green precipitate. If add a sol: of
Ammonia and Copper in presence will have a Blue.

Tuesday Jan 10th

Ponderable, and Imponderable ^{light} of 3 kinds gas, solid, liquid
Oxy - Hydro Nitr: Hydro: Solids of 9 kinds that unite with Oxy & Hydro:
And those that follow unite with Oxy: only - which now follow
And first is - " -

Sodium - as before mentioned

Calcium - of Lime - uniting lime with Mercury, in Amalgam
is formed the Mercury is evaporated and leave
Calcium - With oxygen forms

Lime - for mortar 3 Sand 4 fine &c it is soluble in
water which changes ^{is made by pouring warm water on powdered lime till a paste, then cold water} Blue to Green - absorbs Carb:
Acid - Lime water absorbs Carb. acid gas by breathing
in water - Oxalic acid is the Test, white precip:

Lime with the acids as Nitric form

Nitrate of Lime, found in caves - " - Lime with Phosphoric Acid

Phosphate of Lime - detect iron forming Blue (Yel: & Blue form Green
with Carb: acid forms

Carb: of Lime - intimately binds 1/8 part of the surface of the globe
it is said that the Lime in the world said to be from animal origin -
but this is uncertain - there are great varieties of this -
such as crystals, spar, alabaster of the sea and Land &c -
also sometimes burnt for Lime - also Marble but this not
purely Carb: of Lime - Chalk also - " - With Boracic acid

Borate of Lime - of no use - Lime with Phosphorus

Phosphate of Lime - found in this country, burnt, lime

Phosphuret of Lime - decomposes water when thrown into it forms
by passing phosphorus through pure lime -

Lime with Sulph: acid form. —

Sulphate of Lime — found in nature — or burnt lime — also
singlass of this substance — used in agriculture called
Plaster of Paris — but those near the sea are not affected by it —
often found in combination with Muriate of Soda — Pyrites
of Iron form good ground in some soils &c —

Thursday Jan 12th

Lime has some alkaline properties —

Magnesium, obtained in the same manner as Calcium &
very analogous to Calcium — with Oxygen forms

Magnesia, a little alkaline, and changes colour slightly, slightly
decolorable by water, they combine lime, does not absorb moist or carb acid
if it has been found pure near N. York — Broughton Medicine
about the 7th century by a Monk — Combines with acids

Sulphate Magnesia or Epsom Salts & found in the Epsom salt springs
now obtained from sea water — called Epsom

Carb. Magnesia also sulph of lime with muriate of magnesia
found in nature and when the carbon is driven
off forms Calcine Magnesia — or Carb Potash
and sulph. Magn. with heat carb. Magn. precipitated
used for glazing fine china in France —

Barium obtained as Calcium & Magnesia — has the properties
of potassium only much heavier — found in nature
always with sulph. acid by affinity and is the test for it.
Very heavy — greyish colour, changes blue to green.

A violent poison — the best for killing dogs &c

Burns with spot of blue by a yellow flame &c

Carb. Pyrites — more poisonous

Strontium terminates the alkaline earth, much like Barium
& strontian like Calcium —

Sulph. Strontium found in nature, Lake Erie. Combines with
acid — not poisonous (cheate)

Muriate Strontium, burn with alcohol of singular colour led in

Friday Janry 13th

Nitrous Oxide Thow made
Sulph- Acid - Sulphur & nitre
Potassium; with Compounds

Carb. Magn } heat make Calcined Magn
Sulph- Magn }

Sulph. and Carb. Barites - earth poisonous

Strontium, not poisonous, tested by Combustion

which is of a red colour - it is like
Pyrites in specific gravity -

Earth's proper

Aluminium - not yet found out - with Oxygen
form Alumen - a white substance without
taste or smell, and may be moulded when
moistened (the principle in all pottery
also composed the gems as topaz &c
with silix form the Garnet also the
asbestos which will not burn (Dr
Franklin had a handkerchief of it)

Alum, of Sulph acid, Alumen and potash - redder
Vegetable Blues which shows that Sulph
acid predominates - obtained from alumie
- nous earths - heat forms the burnt Alum or
Calcined - Brown sugar, alum &c with
heat form a combustion or Homburg Spiropilus
(for dyes used for making the colour stick to them - used
before dipped in the dye)

Antimony - famous America - Sulphuret of ant.
with sulph acid also in Europe in sulph.
of antimony as in America - pure or the
Regulus of Antimony little changed by the air.

Phila
The Banks of the Schuylkill
On the banks of the Schuylkill 20 p

Prof Green

Monday Jan 17th

Antimony compounds
of 3 - Yellow, White & Grey
with Oxygen —
yellow antimony or

Antimonie acid — Contains the most oxygen, of no use
like acid
white or

Antimonious acid — of no striking character — or stibic acid —
grey antimony or
Sulph of Antimony — very fusible (used in medicine) (with sulphur forms

Sulphuret of Antimony (called Antimony in the shops) — When exposed
to considerable heat is converted to

Glass of Antimony — And is transparent — often adulterated, of no use;
Crocas of Antim.

Hermes Mineral — of Sulp Ant. and Potash equal part fused in water
and Boiled and Hermes Mineral fall to bottom
after the Hermes has deposited, add a little
Sulp acid and you have the

Golden Sulphuret of Antimony — &c

Phosphate of Antimony or James Powder — Sulp. Antimonialis — Phos.
of lime ⁴³ & Antimony ^{parts 57} — equal parts of Sulp.
Ant. and shavings of Hearts horn —

Tartrate of Antimony — Sulp Tart. Potash combined with Antimony
or Tartar Emetic — of this Antimonial wine — bitter
strong substance, ^{as Tea} decompose Tart. Emetic also vegetable acids
as vinegar — Test Sulp. of Hydrogen —

Antimony Combines with all Tuesday Jan 17
the metals And forms alloy as with Tin forms Pewter for en-
graving with Iron forms

Marshal Regulus - has a singular star -

Glass tinged Blue by Antimony still becomes darker for several years -

Molibdimum - from Mollibdena of nature) perhaps never found - Combines
with Oxygen precisely as Antimony - also Sulphur

Cromium - many mineral owe their colour to this Mineral (ex. regoma - colour)

Thursday
Lead - found with Sulphur - fusion drives off the Sulphur &c.
It combines with Oxygen in 3 proportions all Oxides and
no Acids as the last class - if should not be used
with water, for family or ship purposes - with Oxygen -

Yellow or Proto oxide of Lead - or Massicot - insoluble &c. may be con-
verted to Litharge by which stone ware is glazed. but
dangerous when used for sweet meats or Acids or any
thing that ferments - used in medicine -

Red or Auto-Oxide of Lead or Red Lead - from the Yellow used fusing
it with glass giving it transparency and softness for
prisms, mirrors - lens &c. &c. -

Brown Oxide or Lute Oxide - contains one proportion of Ox-
ygen more than the last or Red - for glass - drying - easily
changed to glass of lead and combines with all metals
except Gold, Silver and Platinum - with Nitric Acid forms

Nitrate of Lead &c. which is revived by Sulp. Hydrogen
with Carbonic Acid - a ferrous acid form

White Lead - or carb: of Lead - made largely from the fumes of
boiling vinegar under sheet lead -

Phosphate of Lead, of Green Colour - With Phosphoric Acid, no use
Sulphate of Lead, of no use -

Shot is made of $\frac{1}{2}$ lead and Arsenic fused together. &c
Salt of Lead, sweeten wine &c - ^{the poison} detected by Sulph: Hydrogen
of Alloys - Combinations of Lead & Antimony 1 part in 16 for
making printers types - -

Friday Janry 2th

Manganese; has a stronger affinity Oxygen than any other
substance - the best of steel contains a small proportion of
Manganese - - Proto Oxide - Duto Oxide - Peroxide

Iron - Of the greatest use to man of any other Metal - is magnetic
if a small portion of Carbon be added, fused at 22.000° Fahrenheit.
unites with Oxygen in 3 proportions - by heat form

Black or proto Oxide - &c } acids with the Earths or Oxides
duto Oxide - } and in medicine } and form the neutral salts

Red or ^{duto} Peroxide or Unit of Iron 40 oxygen to 100. used the same as the
proto oxide - With Carbon Iron forms

Steel also Black Lead or Plumbago - and for pencils - -

Steel by keep bars of ~~Iron~~ Red hot for days covered with
charcoal powdered - add glass for Cast Steel
Steel is a Carburet of Iron - a drop of Nitric on pure
Steel leaves a mark no so on common Iron &c

Phosphuret of Iron brittle when cold - malleable when hot -

Proto Sulphuret of Iron }
duto Sulphur of Iron } Made by rubbing Sulphur over red hot Iron found in Na-
ture and of great use called Iron Sulphates

And often mistaken for gold - Sulp. Hydrogen made from it by pouring any Acid over it -

Pure Iron will not maintain magnetic - but steel is - but if you add more Carbon - And it looses its magnetism the same, with Sulp. Phosphorus &c -

Salts of Iron

Nitrate of Iron - of no use - by dipping Iron filing in Nitric Acid.

Ferrocyanate of Iron - with Prussic Acid & Iron - added to Salts of Iron forms a Blue precipitate, ~~for~~ forming Prussian Blue made, equal parts least Potash & Acid & blood then put in a crucible then add 7 or 8 parts of water filter Alum 2 parts And one part Sulphate of Iron are then added in solution, so is made the Prussian Blue in large quantities -

Carb. of Iron found in nature - or precipitating Sulphate of Iron with Carb of Soda - or by exposing filing moistened to the air - the Carb of Iron the best way of giving it internally - as in Calybrate Springs Carb. of Iron good in Lie Cholerae -

Sulp. of Iron or Copperas or green vitriol of Sulp. Acid & Iron Sub acid 40 part 36 Iron - ~~Called~~ ~~Chelifer~~ An astringent

Phosphate of Iron of little consequence

Alloys ~~is~~ Tin, Sodium &c

Test 5 - or Hydrocyanate of Potash - Weak solution of Common Sea changes it black

Iron - Lead - Manganese Green

Rhodium

~~is~~ unite with Oxygen in 3 proportions

Rodium is not soluble in any acid of no use

Proto-oxide & per-oxide -

Cerium - proto Blue - auto Brown, per Red - with Iron ^{form} Tetanus

Tests for Iron is the Magnet -

Those substances that combine with two proportions of Oxygen only and neither acids -

Copper - is found in nature nearly pure - obtained pure by dissolving it in Muriatic Acid - specific gravity 9 best for Musical Instruments -

Proto Oxide is red, frequently found native Oxy: 12. Copper 100

Per Oxide is Black made by heating the scales Oxy: 25 Copper 100

Sulphuret of Copper - Sulp²⁵ & Cop: 100 heated over a lamp found in nature the copper of Commerce obtained from Sulp: of Copper -

Phosphuret of Copper - Phos 20 - Cop: 100 of no use

Arsen^{ar}et of Copper - ^{Plated} Silver Ware - the Copper covered by Arsenic to make the Silver stick -

Hot Short Iron - is brittle when hot - of Copper & Iron &c

Nitrate of Copper ^{Salts -} by dissolving copper in Nitric acid - if exposed to air becomes the

Nitrite of Copper &c

Carbonet of Copper - ~~if~~ by precipitating the Nitrite with Potash Copper when white give the Carbonet of Copper which is poisonous in a high degree - if they are used the liquor must not grow cold in them or they are poisonous - Antidote White of Eggs

Sulphate of Copper - the most useful, Blue vitriol of Commerce, is found in streams issuing from Mines - Combines in definite proportion with the Sulphate of Iron - An Emetic - An Antidote of Eggs - It is this that give Brown appearance to Cuprum Ammoniacum & Triturate Carb Am: & Sulph of Copper the become fluid and ~~go~~ are useful in Nervous diseases.

Arsenate of Copper - Steel green used in the arts.

Tests - the best ammonia giving a Blue precipitate - Hydrocyanate of Potash a Brown - Sulphurated Hydrogen gives a dark precipitate & may be precipitated when in solution on the blade of a Knife -
Thursday Janry 26th 1826

Cobaltum - used for giving to glass a Blue colour - of a light grey colour of a reddish tinge - difficult of fusion - ~~of~~ gravity 7.7 - like Iron is Magnetic and is better suffering no change from exposure to the atmosphere - Combines with Oxy-
forming -

Proto Oxide - is Blue and give this colour to substances combined with it and gives glass &c their colour - 1 gr colour 240 grs
Per Oxide - is Black ~~azure & small~~ is this mixed with Silica

all the mines of Cobalt are in Europe and valuable to colour glass - pottery - china And many other substances -

Combines almost always with Arsenic existing in the Ore Combines with Inf. substances but of no use -

Salts of Cobalt are numerous but of no use, with mucic acid forms a beautiful invisible ink and when heat is applied ~~it~~ we have a beautiful green colour -

Test - Sol: of Potash precipitate a Blue colour

Cerium of no use — never having been examined

Aurum - Gold — found in S. Africa - Carolina
if not pure made so by a compound called Nitro Muriatic
acid in a green Sulph. has the greatest sp Gravity 19.
except platinum — Theriagen is the lightest substance
not affected by the air — very malleable even to 280,000
part of an Inch — 1 gr may cover 58 inches — light on
passing through the Gold leaf is decomposed and shows
a green colour — Melts at 5000° Fahr: — Known
very early even the earliest history —

Protoxide, is Purple, done by passing an Elect. Spark through ^{it}
is used for giving China this tinge of purple —

Peroxide, is Brown — may be procured by precip. in N. Acid
Sometimes used in Medicine — does not combine
with Sulphur — if mixed with Sulph. of Potash may be
dissolved by water —

Phosphate of Gold of no use

Alloy with Copper give it strength & hardness and proper
for coining and does not take away its lustre —

Carats divid: in 24 parts — Gold Copper & Silver may
be analysed by Nitric ^{acid} precip. the gold in a Black powder
but generally done by Cupellation — Lead combine ^{gold} with
French & Spanish coins not so pure as the U States

Amalgam of Gold & Mercury for gilding silver ware
and the Mercury having been driven off —

Salts are three with Nitric and Muriatic Acid —

Friday Janry 27th

Mercurium or Quicksilver - found in Spain & Peru in mines
at the common temperature is fluid different from all other
inflammable - at 39 below 0° may be frozen - and then may be
beaten out in plates &c - Its gravity 13.50 ~~at~~ when frozen
is 1.5 - Often adulterated with lead - is found out by evaporat-
ing over a lamp if lead be present it will remain - is
purified by heat - In gas applied to heat has great
force - Combines with Oxygen forming

Paste or Black Oxide, by agitating mercury in a bottle

Mer: 100 Oxy: 4 - also by triturating ⁱⁿ Oleaginous or Laminaceous
substance - as with Magn: it forms a medicine called Quicks:
and Magn: or Chalk. If with Cond: of Roses and then

mixed with starch - make the pills of mercury - the
ointment made by triturating Lard -

Per or Red Oxide ^{Red precipitate} - by boiling mercury & exposing it to
air - dissolves sparingly in water - is poisonous - ex-
Mer: 100 Oxy: 8 - adulterated with red Lead - to detect
throw it on red hot Iron if lead be present ~~the~~ it will
remain - for medicine ^{formed} of Nitric Acid

3 Mercury 4 parts dissolved and exposed to a sand heat &
drive out the acid - very useful as a caustic for
the skin - good for ulcers of foul nature - Combines with
Sulphur forming sulphuret found in nature, separated by
Iron filings -

Proto Sulphuret of Mercury or Ethiops Mineral - adding
Sulphur to Mercury slowly - Mer: 8 Sulp 100 Mer 100 Sulp 8

Green

By Sulp: of Mercury or Vermilion Subliming Black Sulp:
of Mercury Sulp: 16 Mercury 100 - - Subl: forming a cake on
the interior of the vessels -

Amalgams are decomposable by heat - with potassium grs
Mercury 70 grs forms great heat - with Amm: &c
with Iron Mercury has little action - with Copper acts very
thick ^{forming Chinese copper} gives lead a red appearance - Use to separate
gold and silver from their impurities & ores - With Tin &c
Salts - Proto Sulphate of Mercury - Per Sulp: of Mercury -

Nitrate of Mercury - of Proto Nitrate of Mercury & Per Nitrate Mer:
^{Proto &c} the acid dissolves it even with of Mercury, crystallized they
may be exploded by percussion when Phosphorus is added -
If the Nitr: of Mer: be precipitated added amm: you have Hydrag-
reenum -

If the Per Nitrate of Mer: be well mixed with Lead for
the Citron Ointment - Any alkali precip: this Nitrate

The Possipate of Mercury - Mer: boiled in solution of Prussian Blue
and this forms the Hydr: Cyanogen gas by boiling -

Carbonate of Mercury - by adding any alkaline in solution -

~~Phosph~~ Sulphate of Mercury - in two proportion of Sulp Acid - with Per &
Proto Sulphate of Mercury - if hot water is thrown on this we have
a yellow precipitate called Turbeth Mineral an Emetic.

Tests - Copper, detect Mercury in solution giving the colour of silver. - And heat will drive it off again -
Prussiate of Potash throws down a yellowish precipitate.

Nickelium obtained from Shear - can be drawn in wire 8 times heavier than water - Magnetic with Iron & Cobalt -
- ^{the force} Needles have been made by this substance not being affected by it air and might be employed for instruments if we had enough
Combines with Oxy.

Proto Oxide - by boiling in air or dissolving in a yellow precip: by nitric acid - is soluble in Ammonia - gives the green colour to glass and is not affected by heat -

Per Oxide is Black &c.

- With Copper forms the White Copper of China - with Iron unites in all proportions and ^{this combination} always found in all stones of Meteors which certainly are not of Terrestrial origin - all we have no doubt such Meteors do descend (see 6^{ch} ^{vol} of the American Philosophical Transactions) they descend in a voluminous & volumes of fire in a state of ignitions - and all agree in their combinations - they are ~~found~~ formed instantaneously in the air, ~~proba~~ it is probable that Magnetism has a great influence

The salts are green in precip:

Test are Hydrocyanate of Potash - or Prussiate of Potash

Platinum. Green white colour like silver. grav: 21.25
with Iron may be welded, being very hard - ~~with Gold~~
resist the effect of acids - is elastic - expands very little
- worst conductor of heat we have - Must be soldered by
gold - found in America - combined with gold
Platina very difficult of fusion

Proto Oxide is black is only affected by galvanism

Per Oxide not known

Spongy platinum, will set fire to Hydrogen gas -
made by precip. from an acid solution - might be used
for making instantaneous light and cannot be explained
why this is the case - Platinum in purity in wire held
over ether decomposes it - when the Platinum is heated and
by holding it over the ether will be kept red hot - by the
Caloric given from the gas evolved from the vapour of the ether
- ether composed of Carbon & Caloric - (Forms also the compound
without flame of Sir H. Davy)

Pot Platinum leaf held with Tin and heated will
be placed slightly - 7 parts Platinum 16 Copper 1 Zinc form
Compound resembling to Gold - One 17 part united
to gold made it white -

Platina & copper are susceptible of a very high polish

Test Ammon. solution & Potash in solution have
a yellow precipitate

Tuesday

Stannum or Tin known at the earliest period, brilliant malleable
if rubbed emits a peculiar sound - curious sensation when placed between
the teeth - a cracking noise on being bent - When beaten out is tin foil
Spec: grav. 7 - Powdered Tin, made by shaping Melted tin in a wooden
box lined by chalk - used as a vermifuge, this and another prepa-
ration very unsafe -

Proto Oxide - by heating tin in the open air - is of a blackish gray
100 part Tin 16 Oxide -

Per Oxide, by pouring N. Acid on the grain Tin, and the powder will
descend which when heated forms this Oxide - is used for making
a white enamel the impression first made on glass and filled up
by this - When the Oxygen is driven off you have the black Tin and
is not so pure as the grain Tin. The Oldest Mines are the Cornwell
The Oxides have something the property of Acids - and combines with Hydro-
-gen gas - with Sulphur -

Proto Sulphuret - contains half the Oxygen the Py Sulph: has
Py Sulphuret of Tin or Mosaic gold or aurum Moscovium

Alloys of Tin & Iron form all the tin Plate, take thin clean Iron
plates, cover with Lard, and dip them in Melted Tin and they have a
proper coat -

With Copper form Bell Metal, Bronze, Cannon Brass -
Bronze - 100 Copper 9 or 8 of Tin also the same in Cannons - The Tin make the
Brass more fusible &c - Silver Coins have been counterfeited by means of
tin - with Copper makes it more sonorous - 20 part Tin 80 of
Copper used in China by the name Gong a musical instrument
Mercury with Tin. used for coating mirrors or looking glasses - tin foil
first laid on the table and pour Mercury on it and it forms an amal-
gam and the glass is pressed upon it for some time, and you
have it complete - Tin & Lead form tin foil in equal part or 2 L & 7 -
Salts - used in the art of dyeing especially in scarlets - A weak solution of N. Acid
rubbed over the Tin produce a beautiful crystallization - Colour Ware - yellow
Test - Muricic of Gold produce a purple precip: - Strawberry green

Green

Tuesday Jan 3rd

Uranium - of which not much is known is used for its
containing of a new Yellow Green Oxide with Oxygen
form some Oxides - of use - is the last
of this class -

Vanadium or Vanite is of a new class - combining
in two proportions with Oxygen, but one has partially
same Acid qualities - found in small quantities
One of the heaviest metals & requires a heat 2000
higher for its fusion than Iron, with Oxygen forms the
Proto Oxide - which is Brown - and is very inflammable
sticking fire before it is red hot and forms the
Per Oxide - if heated is Green becoming Gray & Black
Salts there are some but are of no use -
Acids improve different colours - and if found in
sufficient quantities would be of much use for this purpose.

The next ~~class~~ ~~of~~ ~~Clas~~ Clap unite with Oxygen in one proportion
only

Thursday Feb 2

Bismuth - whitish - tinged with brown - laminated appearance
not malleable - fuses at 476° and crystallized - is very tenacious
Sp. Grav. 9.8 - obtained from Saxony also in this country - if heated being
exposed to the air has a yellowish steam and if heat be added
to this steam we have the oxide and is yellow - easily fused to
a glassy appearance - 90 Bist. 10 Oxy: the yellow oxide used in glass
also in dyeing - if added to potassium changes the hair
black -

Brist. 8. ^{pt}, Lead 5. Tin 3 forms an alloy, easily melted, spoons
sometimes made of it and melt when put in hot tea —
^{used in types}

Nitric acid diluted produces the Nitrate of Bismuth and if
more water is added give the Sub Nitrate of Bismuth —

This has been used as a ^{lately revived} Tonic, — the Pearl or Flake White sold
by perfumers, for the skin of the face, but if the person eat eggs
it changes the skin black — the same effect from a coal fire or
the Sun — if characters be written with it. And when put
in cold water you have a white — And these may be ren-
dered black by Hyposulphuric — Salts of no use

Pure water precipitate a white powder from a solution
of Bismuth —

In Zinc we find Calcium,
§ Ercidium, orpium & Palladium have all been found in Pla-
tina —

Silver — is harder and more elastic than gold — receives a
highest polish except steel — maybe ~~of~~ beaten out very small
Six feet of wire ^{called} Gold lace weighs but one grain, but
is silver colored as gold — Melts at 3000° — found in Mexico

& Peru — Some native silver found is pure — One Oxide
by fusing it on charcoal — Or by decomposing the chloride in
Nitric by lime water. 100 Silver 75 oxy: — the Oxide is
easily decomposed by ammonia — forms a fulminating
powder very explosive even when damp — obtained by
pouring liquid ammonia on Nit. of Silver forming a black
powder — Hyposulphuric removes it from some of its solutions
With Sulphur and phosphorus — the Sulphuret of Silver, is
made by holding Silver coins over the fumes of Sulphur
and may be knocked off by a hammer and in this way
renders it too light — is the best test for Sulphur

The Alloy of Silver & Copper is white and hardens it and
renders it more lustrous — Coins U. States 1 part Copper
8.3 of Silver — Silver plate of this alloy — An amalgam
used for plating with Mercury then the Mercury is removed
of by heat — the Silver plate close to Copper for plating
stirrups — — Fulminating powder. Ag 100 grs

Nitric Acid Zij alcohol Zij & heated and the precipi-
tated powder is the compound — Called Fulminating Mercury
There are but three Metals that resist the air at a high tempe-
rature, Gold, Silver, & Platinum do not become oxidized —

Salts — a Nitrate, Nitro Sulphate of Silver — by Silver thrown
in nitric acid deposits in crystals, if the acid be much
diluted it remains in powder, ^{found in the shops} — if the Copper remain in
the Silver the precip. will be green — Lungs Animal substance
es yellow — Nitrate of Silver with a little gum water for
marking indelible ink for marking linen — a little
drop of ink may be added — or ~~or~~ rub over the linen
with Potash in solution first to prevent its running — Nitrate
of Silver used for turning the hair black, but take care of the
forehead — also for staining marble — The crystals have
been called the galls of metal, and when these are heated
form Argentum Nitratum &c — if Beat in powder with Phosphorus
is very explosive — 100 grs white Silver: alcohol and Nit. acid Zij
heat to precipitate and constitutes fulminating — ~~which put in~~
paper with Lard & shot form the Tarpedoes — to be made
very carefully — May also be made by — Dissolving Silver in Nit. Acid
and add alcohol, 2 grs sufficient for some quantity — explosion
occasioned by Nitrous ether Carbonic &c being forming —
Silver precipitated by Copper and finally burnt out on Aloriza-
tion — Mercury also forms a beautiful tree only a few drops

Antiseptic solution of Silver very useful to the Surgeon - in Epilepsy
has been used internally - To produce pure Silver from solution
precipitate by Copper ^{Aqua fortis}

Nitro Sulphate - Nit 1 part to 10 Sulp Acid - has no effect on
Copper - and is used for removing Silver from brass, copper.

Tests Potash Chromate of Silver The best Test for Nitrate of Silver -

The blow pipe also very necessary - Hydrosulphuric acid of Potash

Mocanium of no importance - the last of this class is

Zincum - Spelter - procured from various ores - if pure is Blue
colour - soft Spec. gr. 6.7 - Malleable - ductile - if rubbed
emits an odour - granulated Zinc melted run in
wooden tub - very inflammable when beaten in leaves takes

fire, and is used for the ^{Blue} stars seen in rockets -

Is very abundant in China and of great use - very good for
shielding ships &c - not good for culinary purposes - Melts

680° C, has a great affinity for Oxygen - & when thrown
into a red hot crucible it burns beautifully and forms

Oxide of Zinc - the fumes form the flower of Zinc -
the oxide is white - for medical purposes to be precipitated
from Sulp. of Zinc by ammonia:

May be used for painting and is more durable -
The flour used as a Tonic &c. Also in ointment

Sulphur of Zinc - from which sulphur is obtained &c - the
red oxide of Zinc found in Spain -

Zinc and Tin form an alloy that is very bright and used for
spelter - with Copper constitute pewter 2.6 Copper 1 Zinc
Princes Mistle contains more Zinc - contained in the
Chinese Coins - Zinc and Mercury form an Almagam
for electricity

Carbonate of Zinc is native of which Brass is made with Copper 64. Zinc 33 Melted with
in medicine, used external applications charcoal

Green
Monday Febry 6th

When Nitric acid is poured on Zinc the acid is decomposed forming the Nitrate of Zinc — If Sulp Acid is poured on it and a little water is added the water is decomposed — ^{it} forming the Oxide of Zinc then the Sulp acid unites to ^{this} and forms the Sulp of Zinc — to know if it be true — dissolve it ^{and throw in Zinc filings} in pure water, the impurities will fall to the bottom and there will be spots in the solution — if pure none of this — & Vitriols Blue, white and green from Iron &c — Sulp Zinc contains some water — is a safe emetic for Poison it act immediately — dissolved will also form a good wash for ulcers &c —
Salts — known by being colourless, Cyonate of Potash produces a white precipitate — to this class might be added

Columbium — Unites with one proportion of Oxygen and some say it is of some acid properties — is the same as Tantalum found in Iron, Magnetite, &c is white in powder. Unites with Potash but not with acids — if water be added to Columbium it is decidedly acid — if the water is driven out it loses its acidity — her Murray ~~is~~ supposes that it is not the water does not produce the acid, but the oxygen and Hydrogen Hydrogen weaker than Oxygen — (55 substances have been enumerated now — and now we come to a different class.

And now we have gone through with these classes and there are yet 3 substances and then we have mentioned every substance in the Universe — all the above unite with Oxygen

Tuesday Feb 9th

Chlorine - is now generally believed to be simple made by pouring Muriatic Acid on the Black Oxide of Manganese. All the Muriatic Acid & Chlorine is produced from Salt and therefore is made of salt itself 8 parts Salt 3 of Manganese 5 of Muriatic acid & 4 of water - to be caught in bottle over water - is green in colour according to name (Klapp's green) is absorbable by water in less than 40 degrees - but caught over warm water - Water saturated with

Chlorine forms the bleaching now used by all. fatal to animal ^{support flame} - is heavier than common air - Changes beautiful blue colour as in calico &c and cannot again be restored - if however the cloths be perfectly dry it will have no effect on it - It supports ~~comb.~~ Combustion and contradicts the rule that where a candle burns Air is also made fine - Phosphorus exposed to it takes fire instantaneously - (Ammonia relieves the lungs when oppressed by it) - Copper Zinc gold Iron - Arsenic take fire in this gas - and is thought to form a binary compound and will form a chloride ^{as Chloride of Iron} - or acids (or by heavy Phosphorus an oxide and Phosphoric acid) and combine as oxygen - Heat - light - Elect. Magn. are united in this as in Oxygen - it unites with Oxygen forming one Oxide & 2 acids

Oxide of Chlorine - of light green called also Uchlorine. Make by 50 or 60 grs powder Chlorine of Potash with strong Sulf. Acid & it become solid then placed in a retort and apply heat by a water bath so that you at 150° and not more it will explode - or Pour strong Sulf. Acid on a little Salt act with great violence on combustible substances
 $2O + 9 \text{ Chlorine}$

It is lip disengageable in small will not unite with Mercury
36 parts Chlor: 32 Oxygen ~~is~~ its composition - by explosion two
parts are expanded to three -

Chloric Acid - cannot exist unless united with water or some
other base - Is made by pouring in dilute Oxy Mur. of Bary
etc drop by drop of Sulp Acid - this with the Salts form
the Chlorates - 36 parts Chlor: 40 Oxygen forms it
3 of Oxy - 1 Chlor

Per Chloric Acid - by distilling the per Chlor: of Potash &
Sulp Acid in equal parts - - - with Nitrogen
or 5 vol: Oxyg: 1 of Chlorine - only found in Per Chlorine of Potash

Chloride of Nitrogen, is made by filling a glass vessel with
1 part 12 parts Water this inverted to a glass water & Chlorine of Potash
It is transparent liquor - evaporate in air - & down

peculiar - explosive very - all vessels should be perfectly
clean

Chloric Acid Combines with 13 substances, & the name of are
but the Chlorate of Potash - And Chlorate of Barytes from
which we receive the Chloric Acid -

Chlorate of Potash - Make by passing through ^{a solution of} each of Potash
a stream of Chlorine gas, ^{and it crystallizes} - if exposed to heat it gives off $\frac{1}{3}$
of its weight which is Oxygen gas - ^{it is a very} tall bodies, with a greenish ^{and thick}
with a hammer rep ^{an water add}
a little sulphur ^{glows under the water - if}

it is used in gunpowder - (perhaps used by Panaparte by
explosion lock in the last Campaign in France) - (A new kind
of gun exhibited in a walking cane with a $\frac{1}{2}$ gr of Chlor: of Potash
on the principle before mentioned namely a hammer instead of a lock)

3 parts $\frac{1}{2}$ part Sulf & thrown in Sulf Acid take fire —
a few gr put in a testp^m containing Mur Acid diluted
is very good for bleaching or taking stains as in silk &c.

Chloride of Nitrogen is very powerful fulminating

Chloride of Hydrogen - or Hydro Chloric Acid - if equal volumes
of Hydrogen & Chlorine and combine gradually ^{in a tube} it brought to light carefully
but if exposed to the direct rays of the sun explodes violently —
no explosion when exposed to the light of a lamp —
after they combine form the Marine Acid or Muriatic Acid
when much diluted with water — it is however procured
from common salt - or chloride of Sodium as salt is — ^{and the} ~~Hydrog~~ ^{Hydrog} comb: Chlorine and makes the Acid in equal
parts of both gases —

It is heavier than air - extinguishes flame ^{and} just before ^{it is diluted} ~~extinguished~~
there will be a greenish colour — if combines with water
readily 1 vol water absorbs about 480 vols of the ^{hydrochloric} ~~hydro~~ gas — ^{generally}
caught over Mercury — ^{has} ~~any~~ ^{no} deleterious effect on the lungs.

Not absorbed in boiling water — Generally made by Sulf
Acid on the salt and saturating water with the gas emitted
is of a yellow colour — used as a stimulant - it neutralizes
Potash &c. Chlorine is better, by this way
a dish of ~~acid~~ Sulf. Acid then poured on
and go out for 2 or 3 days to use Chlorine
only add 3 parts of Black Magnesia to an
there by applying heat —

Green

Friday - Feb 10th

Muriatic Acid - a compound of Hydrogen & Chlorine in equal parts and is always in gas except united water - the Chlorate of Potash is the chief of our instantaneous match but not a sulphur match -

Muriatic Acid - combines with the inflammables as

Muriate of Ammonia - exists native called Sal Ammoniac & equal part Ammoniacal gas and Muriatic Acid gas generally made in this way for commerce - used in Dyeing & Medicine

The Muriatic Acid from Salt of Sulf Acid - And lime for the Ammonia -

The best of Coal is the Sulf of Ammonia And common ^{Muriate of Soda} Salt And an intense heat is applied and the forms the Mur Am: for Commerce - used in Medicine - dissolved in Nct. Acid forms the Aqua Rega for dissolving gold - used in Tinning Copper

Muriate of Soda common to nature - the salt of sea water is very impure & at analysis 46 Mur Acid 54 Soda decomposed by Sulf Acid - when thrown in Alcoholic Mixture produces a yellow for lights of Artificial fire works -

Muriate of Barites - by dissolving native Barites in Muri: acid and no heat can decompose it, is a violent poison.

Muriate of Lime - ^{carb.} Lime and liquid Mur Acid is very deliquescent is of beautiful crystals - heat take away part of it strength - ex 51 acid, Lime 49 - produces intense cold - Senofala has a stronger affinity for water than any other substance

by dissolving the rust of Iron in Muri. acid
Muriate of Iron - also dissolves the per Oxide &c has the
strongest affinity for Iron of any other substance - will
take out Iron stains - greenish crystals

Marshall's Flowers - &c made of this - is the best Test for Prussic acid
Ammoniated compound Tinct. of Iron - draws attention of
the Physician

Muriate of Lead - by Muri. acid on Nit. of Lead - is called
Turner Yellow - it allows crystallization -

Monday Feb 18th
(The Sulph. of Copper gives a green flame)

Muriate of Antimony - by dissolving Antimony in Muri. acid
and distilling - when dropped in water
is the most powerful caustic we know of but very deliquescent
more powerful than Nitrate of Silver -

Muriate of Mercury - or
Corrosive Sublimate - by dissolving the per Oxide of Mer-
cury in Muriat. acid - easily decomposed
by Potash & Soda the Soda gives a yellow powder that
becomes red - used sometimes internally in small dose
Antidote white of an Egg beaten up in water -

Calomel - Sub. Muri. of Mercury - the most useful of all the prepe-
rations of Mercury to be made carefully by saturating Mercury
with Corrosive Sublimate and then sublime - decom-
posed by any of the Oxides - if it is not insipid and
insoluble in water it contains Corrosive Sublimate
Add a drop of Armonia and it will turn the
Calomel black but will have no effect on the Cor. Subli.

Muriate of Lin — ~~by~~ by Boiling 1 part Lin in 2 parts of
Muriatic acid has a strong affinity for Oxygen — if exposed
to air or if a little Nitric Acid be added gives the

Per Muriate of Lin added to Cochineal gives a beautiful
Scarlet colour

Muriate of Gold — Gold not affected by a simple acid
but a Compound Nitro ^{spirit} Muriatic Acid has an effect on
it — and readily dissolves it, and is the only solvent of
Gold — by evaporation it crystallises — change the
skin to a dark purple — if Ammonia is added a
copious precip: is produced being very fulminating — is
decomposed by Phosphorus — Sulp: of Iron changes to
a dark brown — Sulp: of Iron combines with
it and forms the Ethereal Gold — and when polished
steel is plunged in it is gilded by it — ~~the~~ Lin foil
the best test for this substance throwing down a
purple precipitate (not necessary to enumerate all
the Murates) * Chlorine of Oxygen & Muriatic acid
gas. & ~~the old~~ ^{the old} Theory and very true —

Chlorine from Muriatic acid & black Manganese by ap-
plying heat the Chlorine will pass off — from the Union
of the Oxygen of the Manganese and the Muriatic acid
gas — Therefore the Muriatic acid gas is a
simple body — And Chlorine a Compound

Sulpho-Muriatic - by adding ~~them~~ Sulph Acid and
a violent action takes place - and becomes black

Tuesday Feb 14

The binary compound of Chlorine

Per Chlorate of Carbon -

Chloro-Carbonic gas - made by the heat of the sun, the heaviest
gas now known -

Chloride of Phosphorus - Per Chloride of Phosphi - with ammonia
forms a substance very much like an Earth and carbon
be decomposed - Proto Chlorate of Phosphorus -

Green
Friday Febry 17

Vegetable Chemistry

Different from that before owing to life or organization which cannot be imitated by art — The ultimate ~~from~~

Carbon, Oxygen & Hydrogen; Nitrogen sometimes — the
3 first is the ultimate principles of plants of every kind
Vegetable substance is always acid when the Oxygen is in
excess —

————— is always Resinous, Oily &c when the Hydrogen is in excess —

————— They are an alkaline when neither is in excess — When vitality ceases the equilibrium of the components is destroyed and decomposition takes place

The plant is nourished by the Sap being chiefly water.

^{The seed contain}
Starch is contained in the seed and called fecula — and exist in the young plant and is the chief of bread — is insoluble in cold water — Soluble in warm — Sulfuric acid decomposes starch — Is one of the proximate principles

of vegetables and consist of 44 Carbon 50 Oxy - 6 Hydrogen are ultimate
Sago consist in the pith — of ^{Palm} Tree — Casava ^{gills} Tapioca —
Arrow root — both from a poisonous root — boil sufficient to allow a spoon to stand in it — at 6 or 700° ~~at~~ they exhale an odour — To dine give a beautiful colour

Gluten - by ~~not~~ washing the starch from ~~separate~~
of wheat flour - is greasy and elastic - putrefaction
taken place it exhale ~~an~~ odour - similar to glue
Coanchoy ^{Indian rubber} a principle of Gluten ^{exudes from the tree} soft elastic & bird
lime similar to this ^{mycharoney} - Gluten contains O₂, Carb. Hyd.
& a little Nitrogen - Yeast contains Gluten also and is
the cause of its lightness - Indian rubber may be dissolved in Ether
Monday Feb 20

Plants are Fixed Oils found in seed only - Vol: Oil found in
every part of the plant -

Fixed Oil - made by pressure - contains 2 substances, one solid stear-
atone and fluid laidan - In the decomposition of Oil by heat
you convert a portion of the Oil into carbureted Hydrogen - and
on this principle the common lamp burns - and greater light
produced by a glass confining the O₂: &c - Printers Ink &
varnishing Oil made by boiling the Oil and driving off the water
Phosphorus is dissolved in Oil and gives out light in the dark - Kept
in a bottle may serve at night - the bottle to be only half full -
Oil unite with the fixed alkali forming soap - hard soap from Soda -
Potash the soft soap - Caustic soap made of Soda & Olive Oil coloured by
Sulp of Iron or Vermilion - Transparent soap by common soap dis-
solved by alcohol evaporate the alcohol and you have transparent soap
Acids & some ~~alkalis~~ ^{rather} decompose soap - as lime &c

Fixed Oils combines with Oxide of substances forms plasters
Oils - H₂O, Carb, O₂ are the ultimate principles

Vol: Oil - obtained by distilling the plants and the aqueous vapours
is carried off - you will have more Oil by adding a portion
of Salt - Bergamot &c are obtained by pressure only - Roses by distillation
Wax is nothing than Oil saturated with O₂ and contained in
many plants and gives it their green colour

Bees-Wax is animal^{oil} - having been digested by the animal as is generally thought - some say only vegetable oil as they are essentially the same - pure wax colourless - insoluble in alcohol - Cerate is wax dissolved in oil - Wax of Carb. Hyd. & Oxygen -

Gum found in all the plant if fluid is called Mucilage, if solid called Gum - as the Gum Arab which is pure gum -

It readily dissolves in water - insoluble in alcohol, but will be precipitated - On being heated it is turned to Charcoal - may be turned into Carb. Hydrogen - of Ox. Hyd. & Carb. has been supposed to contain lime - Gum Tragacath & Cherry not dissolved by water - Gum Kino is purified Senegal gum -

Resin much like gum - exudes spontaneously from the tree - is solid, brittle, non conductor of Electricity - Soluble in alcohol + Carb. Hyd. & Hyd. - Tar is resin containing Charcoal - if Purified give Pitch - Balsam are odoriferous Resins - Guaiacum give Nitric Acid a peculiar colour - Gum Lac produced by an insect on trees in the East Indies - Galbanum is used in Churches - in the Greek &c

Tuesday Feb 21

Bitumens - agree with Resin, Gum, Oil but they have no Oxygen - Captha - lighter than water - inflammable, if exposed a long time to air it becomes

Petroleum - has a peculiar smell - Charlam much like it -

Asphaltum - is Petroleum long exposed to air - burns - they are used for light -

Bitumen Elastic - found in Derbyshire - burns, emits a peculiar odour -

Kennel Coal is all those substances united

Camphor — found in Laurus Camphora — burns with a ~~light~~ white flame — burns on water by stirring about — owing to the rarification of the air over the flame

Serpentine takes up a large quantity of Camphor — and the crystals of Camphor in Serpentine acts as a thermometer when placed in a tube. — Camp. Reginar & Oils ~~constitute~~ constitute an Antidote to the Plague — used as a garnish Camphor may be unmediated by air by passing Muriatic Acid through Serpentine —

With Nitric acid — form the Camphoric acid —

Sugar — found in many plants — as sugar cane, maple &c — Chlorate of Potash & Sugar mixed produce a rapid action. Vinegar acid poured on sugar produces Oxalic acid — If Sulph

Honey — is sugar & gum — (acid it produces Acetic acid — Gum & Sugar much alike. Alkali destroys the sweet taste — and

Manna — from the Fraxinus ornus — (acids revive it.

Acids — of 2 kinds — one which is already formed in the plant the other made —

Oxalic acid — is of the first — or loaf Sugar 3j. ^{dilute} Nitric acid 3iv and apply heat & distill and you — crystals — is very sour — produces instant death — Changes blue to red — composed of Ox. Hydr. Carb. — It combines with all the bases — the best test for lime is this acid — The Oxalate of Iron — the Oxalic acid destroys the iron manacles and does not effect the cloth — found in sorrel &c —

Rosin — in the Bals Tolu — from a plant called Rosa — is a unctuous substance, warm taste, no odor if pure — dissolves in water & alcohol — Ox. Hydr. & Carbon — a test for iron — gives many many Rosin liquors. their smell Citric Acid — by adding chalk to lemon juice & add dilute Sulph. Acid soluble in water — forming citrate — for taking out ink. Iron &c

Q. Soda -
Lith powder } Green
Tartaric acid aa XV-grs
m.

Thursday Feb 23rd
Citric acid in destroying the
caner of clothes.

Potassa Hart's

Sup. Genl. Potap -

Rochell Latts

Gastric Acid & Soda

Pearl White

part of B's mouth -
to paint the skin -

Malic Acid —

Learn Apple - use chalk
to p.p. it - berries &
apples -

Gallic acid & solutⁿ Iron
Proceeds of Iron is the
form of Iron - that will
produce the black

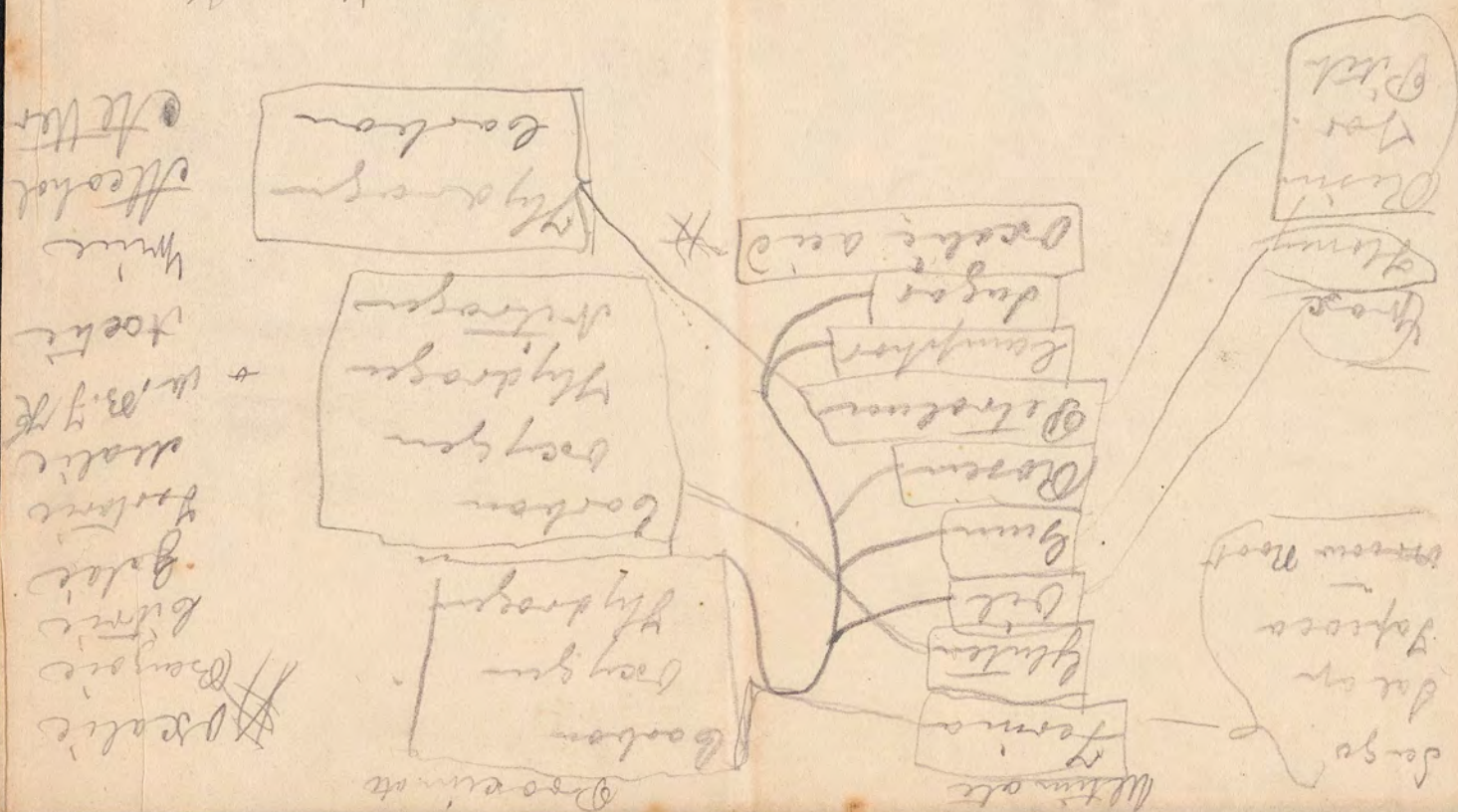
Tartaric acid

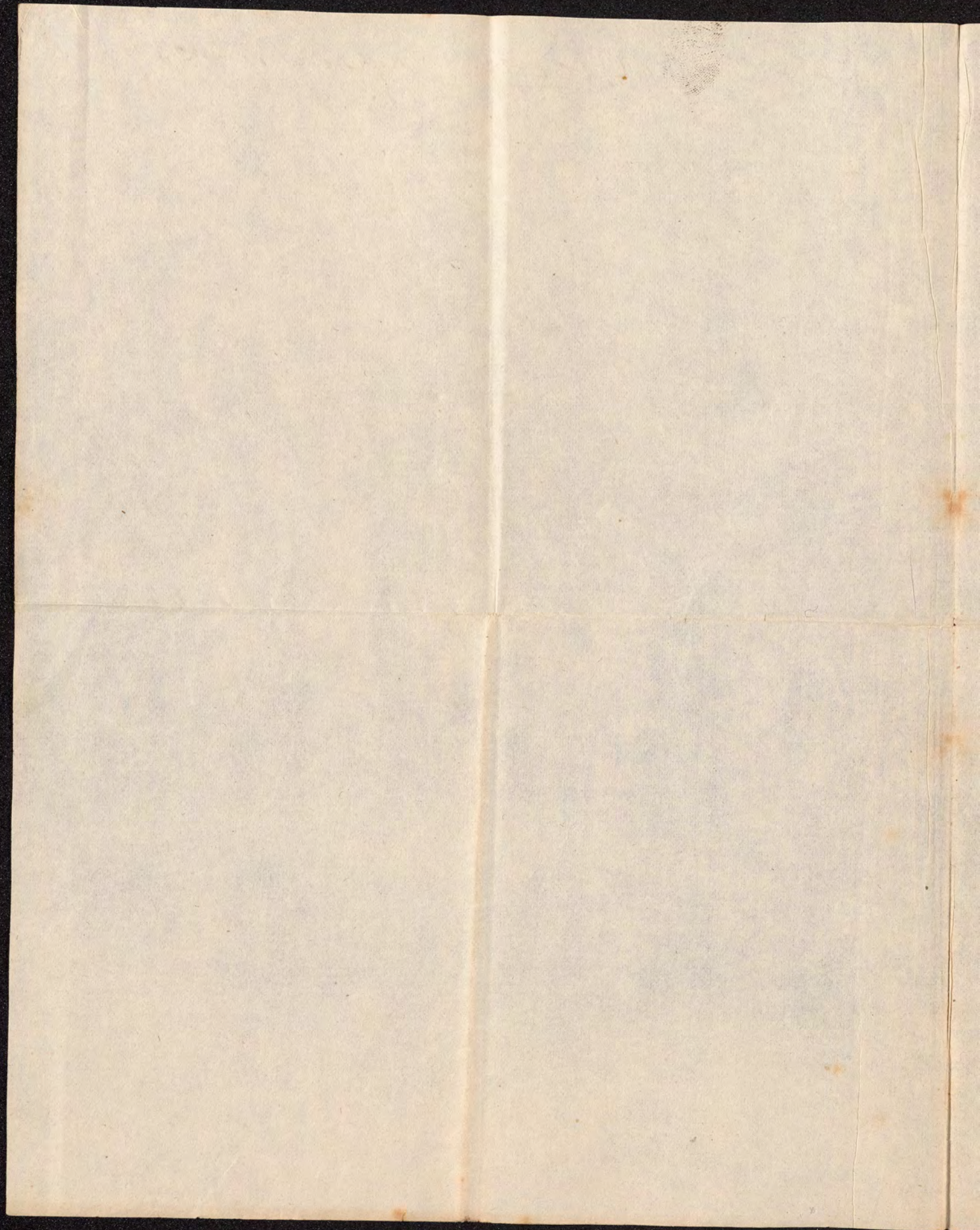
Par 3. Chalk ended to the
creams of Limestone which
the Big Tort. is sup. Mar. Pot.

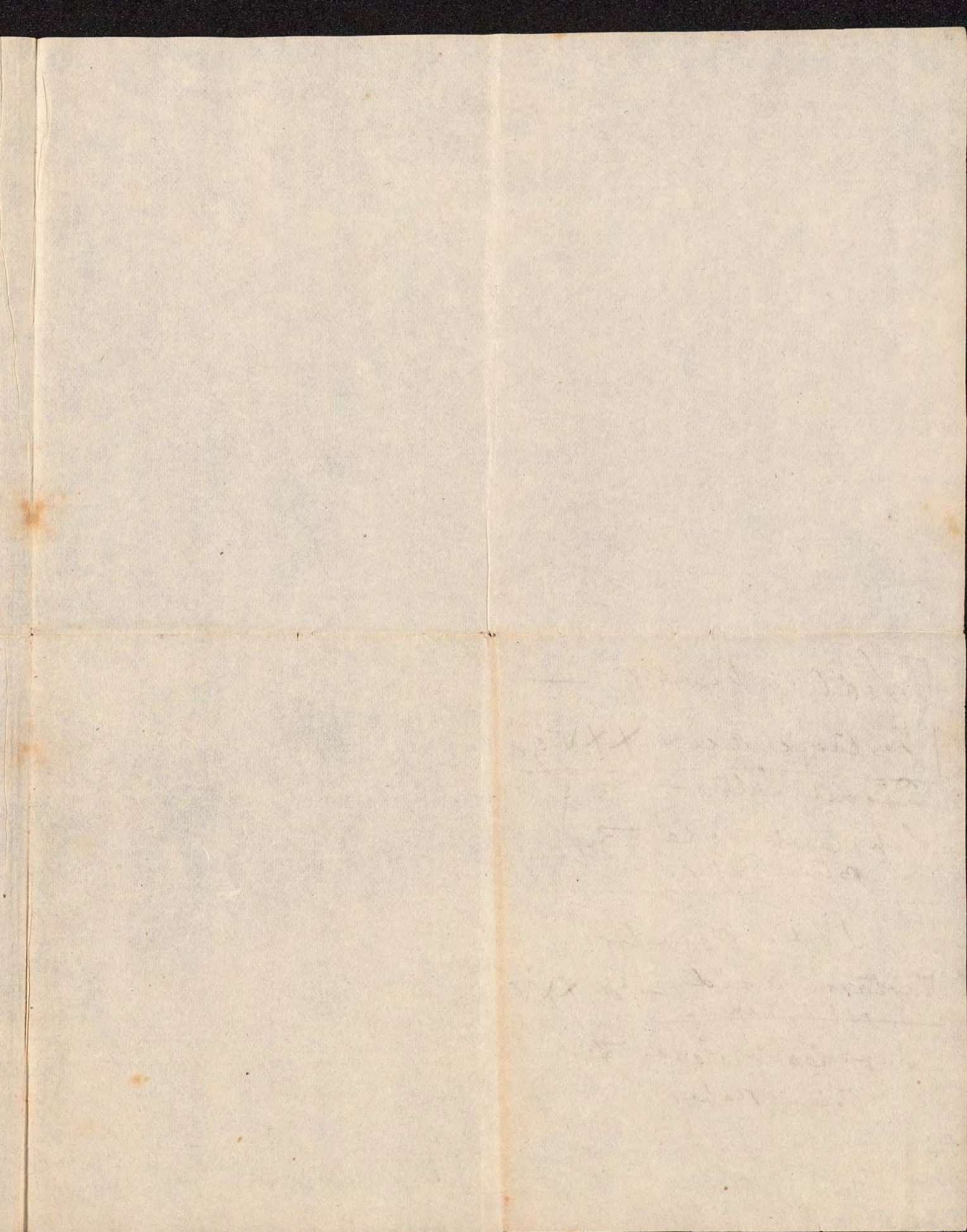
Palte's Acid

Fungia Acid house

A. M. C. B. B. B. B. B.







2^d Claps of acids. XXX

Sept. 1826

Vinegar acetous fermentation

air & oxygen gas is exsorption

oxygen is converted into carbonic

Acetate of Copper

Pyrolignous Acid

Acetate of Turmeric

carb: ammon added to stee acid
Salt of Silicious

Acetate of Iron

— Zinc Burns with
a peculiar flame

Use. Zinc stee acid —

Vinegar & copper acet: Copper
Burns with green flame

Sedlitz Powders

Tartaric acid. XXV gr

Rochel. Salts — 3p

Sup: Carb: Soda. Zij
in Blue Paper.

Soda Powders

Tartaric acid — ss. XXV
white paper.

Sup: Carb: Soda. Zij
Blue Paper

Phosphorus
burns with light blue
flame at 3:20
Phos. Phos. 2:20

Green Feby 23rd

Rubbing sugar in Lemon juice forms the Oleum Sacari-
^{is the best for keeping -}
num - Lemon Acid - is no lemon juice in it but
is Tartaric acid - I mean that and for making punch

Gallie Acid - from galls - from the leaves of Oaks we get
a ball and produce the Gallie acid - is very expen-
sive - is white crystalline powder - combines with
earth - the best is Gallate of Iron which composes
our writing Ink - but you must use the Per Oxide
of Iron - for making Ink -

Tartaric Acid - from the French Wine purified makes
the Cream of Tartar with Potash - ~~the~~ the Acid made
by adding powdered chalk - and adding Sulf Acid -
and crystallizes - ex Carb - 24 - Ox 68 - Hy 6.
Not much used in medicine - but in Levigaty powders
& Soda powders - a triple salt called Rochelle
salt - of Tart. Acid - Potash & Soda - Soluble in 6 times
its weight in water more largely than Glauber salt -
Pearl White - is Tart acid, & Bismuth - for whitening
the face -

Mallic acid - from apples, berries &c by throwing
chalk in the juice of unripe apples - Carb Ox Hyd
Mucosillie Acid - Mucidic acid - Mungon Acid
&c of no use -

Acetic Acid - from fermentation which require air or Ox-
ygen - and is converted into carbonic acid gas - Distill
&c add copper and then add heat and drive
off the acetic pure and will be solid. producing blisters
when it touches the skin -

Pyroligneous Acid - is the Acetic Acid with wood
&c used for preserving meat &c

Acetate of Anamania - from Carb Ammon & Acetic Acid
or spt of ellengerei

Acetate of Barytes - if we use but a test

Acetate of Iron - &c used for dying

Acetate of Zinc, burns with a peculiar flame with spt
of urine - much used in medicine for abating
inflammation is the best of all -

Acetate of Copper - by exposing copper to the fumes of vinegar
and is scraped off in the form of a green powder
and burns with a green flame - for painting &
dyeing - called verdigris

Friday Febry 24th

Acetate of Mercury - not now used -

Acetate of Lead - Sugar of Lead - by digesting Carb of
Lead in vinegar & evaporates, and of great use, easily de-
composed by the alkali - or the Sulph. Hydrogen - Constitute
the calbor Saturni - with Zinc - or Iron - &c

Vegetable; Winous fermentation requires a quantity of sugar
also the fermentation of Alcohol or Whiskey - Alcohol may
be distilled from any of the foregoing fermentations -

Combustibles - might be supposed to compound as
they all contain Hydrogen united to some unknown
base

Metallic - all ~~are~~ composed of Hydrogen united to some
base - In Ammonia - Hydrogen & Nitrogen

Some have said that Oxygen - & Hydrogen are the same only
being in a different state of Electricity -

They say again that Nitrogen is a compound of Oxygen
& Hydrogen - the Oxygen in a less proportion -

Green Febry -

Oxygen } $\uparrow$ *** $\downarrow$
Chlorine } supporter of combustion
Iodine } $\uparrow$ $\downarrow$ *** $\downarrow$

Iodine - discovered in 1812 in Paris -

coloured
solid - on heating becomes a dense violet vapour - on cooling becomes caudorly - is 170 times denser than Hydrogen gas - an non conductor of Electricity - and is negative
has dark scales give the odour of Muriatic acid - leave a yellow mark on the skin - may also be used for bleaching - might be ~~also~~ said to be compound with Chlorine - obtained from KCl and heated in an iron vessel with Soda and add Sulfuric acid - and it is left in a crystalline form -

The only substance that gives out light is Iodine is Potassium
It is analogous to Chlorine - It unites with Oxygen

Iodic acid - 1. Iod: $2\frac{1}{2}$ Oxygen - is a white transparent substance & with Bases form the Iodate - by shaking together a solution of the base and Iodic acid - Iodate of Potash, Soda, Barytes & lime &c

It combines with Nitrogen in the form of a black powder and explodes easily -

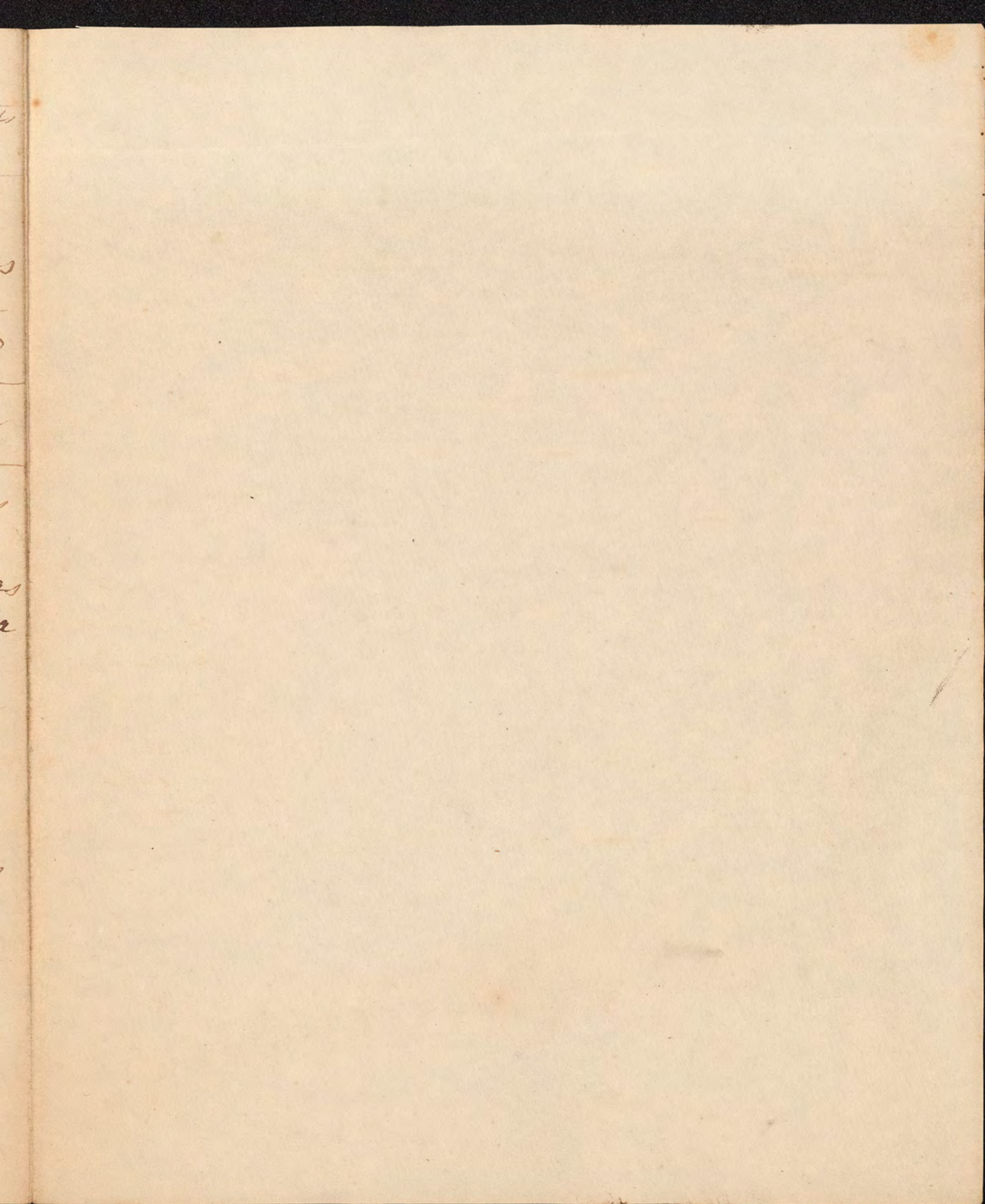
With Hydrogen easily combine when the Hydrogen is in nascent state aa proportions required - ~~Iod~~ Hydro Iodic acid combines with the Bases as Hydro Iodate of Potash for absorbing glandular tumours

It combines with chlorine - Chloro Iodic acid by direct action of the gases on each other and form crystals
Test for Iodine ~~form~~ is starch forming a blue paint &c

Fluorine - obtained from fluor Spar - found on the banks of the Mississippi - & in England - been used in different kinds of ornaments, sometimes called Derbyshire Spar - and is lime with fluoric acid - fluoric acid of pyrogea & a chocolate ^{and is Fluorine} substance decomposed by Galvanism - Fluoric acid requires leaden vessels and great care as the gas will produce great sores on the skin -

Fluoric acid - is colourless - when mixed in water rises as hot iron - it has been used for etching on glass - or engraving by this process - Wax is thrown over the glass - and remove the wax the shape of the Landscape - then pour Sulp acid or Powdered Fluor and hold the glass over it in a half an hour the glass will be eaten out as far as the wax does not protect it -

It combines with ~~all~~ Bases and form the Fluates as the Fluate of Lime -



Dear Sir,
I have the honor to acknowledge the receipt of your letter of the 10th inst. in relation to the matter of the
and in reply to inform you that the same has been forwarded to the proper authorities for their consideration.

The same has also been forwarded to the proper authorities for their consideration. I am, Sir, very respectfully,
Your obedient servant,
J. H. [Name]

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